UNIDO

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

REGIONAL CONSULTATION ON ANIMAL FEED AND RELATED INDUSTRIES IN AFRICA

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Preface

The System of Consultations is an instrument through which the United Nations Industrial Development Organization (UNIDO) serves as a forum for developed and developing countries in their contacts and discussions directed towards the industrialization of the latter countries. Participants in the Consultations include government officials, as well as representatives of industry, labour, consumer groups and others, as deemed appropriate by the Governments concerned. The System facilitates negotiations among interested parties, at their request, either during or after the Consultation meetings.

Benefits deriving from this activity include the identification of obstacles to industrial development in developing countries; the monitoring of trends in world industry with a view to identifying action-oriented measures for increasing the industrial output of developing countries; and the search for new forms of international industrial cooperation in North-South and South-South relations.

Since the inception of the System[1] in 1975, Consultations have been held on the following industries and topics: agricultural machinery, building materials, capital goods, electronics, fertilizers, fisheries, food processing, industrial financing, industrial rehabilitation/restructuring, iron and steel, leather and leather products, non-ferrous metals, petrochemicals, pharmaceuticals, small- and medium-scale enterprises, the training of industrial manpower, vegetable oils and fats, and wood and wood products. The System brings together sectoral decision makers to deliberate on and propose concrete measures to accelerate the process of industrialization in developing countries. It has generated several innovations, particularly with respect to technological alternatives, integrated development and contractual arrangements. The many opportunities thus provided have led to the implementation of projects in technical assistance, investment promotion and technology transfer.

The Consultation process, by virtue of its consensual and normative character, has revealed itself to be an efficient vehicle for fostering international industrial cooperation. It is eminently suited to assist Member States in the formulation of strategies and policies for industrial development.

The System of Consultations operates under the continuous and close guidance of the Industrial Development Board of UNIDO. In addition to undergoing annual reviews and occasional progress appraisals, the System was subjected to an in-depth evaluation in 1989, which concluded that it was making a major contribution to the development and formulation of UNIDO policies and programmes in specific sectors through integration and interaction with the other main activities of UNIDO.

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[1] See *Report of the Second General Conference of the United Nations Industrial Development Organization* (ID/CONF.3/31), chap. IV, "The Lima Declaration and Plan of Action on Industrial Development and Cooperation", para. 66.

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Introduction

1. The Regional Consultation on Animal Feed and Related Industries in Africa was held at Vienna from 5 to 8 October 1993. The Consultation was attended by 54 participants from 36 countries and eight international organizations (see annex I).

Background to the Regional Consultation

2. The Industrial Development Board, at its sixth session, decided to include the Regional Consultation on Animal Feed and Related Industries in Africa in the programme of Consultation meetings for the biennium 1992-1993.[1]

3. In preparation for the Consultation, a regional survey and other documents on the situation of the animal feed industry in the region were prepared by the UNIDO Secretariat and international experts. These documents dealt with basic issues such as the promotion of local raw materials, small- and medium-scale enterprises, and process and equipment for the production of small-scale animal feed using local raw materials and by-products. In addition, country studies were undertaken by experts from the region.

4. The Secretariat convened a regional preparatory meeting at Bamako, Mali, from 15 to 17 December 1992. The meeting was attended by experts from 11 African countries and four international organizations.[2] The main objective of the meeting was to select priority issues, based on the needs of the African countries, to be considered at the Consultation. To this end, the meeting:

(a) Discussed the present situation of the animal-feed production industry in the African region and how best to increase the production of livestock, poultry, derivatives and dairy products through the improved availability of animal feeds;

(b) Identified common and specific constraints that hampered the development of the animal-feed industry in African countries such as the supply of raw materials, the use of agro-industrial by-products, technology, equipment and marketing;

(c) Identified the role of small- and medium-scale enterprises in animal feed and related industries;

(d) Examined and proposed ways and means of strengthening regional cooperation at all levels between African countries.

5. In addition, the Regional Preparatory Meeting selected the following specific issues for discussion at the Consultation:

Issue 1: Promotion of the use of local agricultural and industrial raw materials, by-products and wastes, including research and information on the composition, modalities of utilization and processing requirements as well as quality control and the development of regional cooperation;

Issue 2: Promotion of small- and medium-scale enterprises with special emphasis on appropriate technologies, training and regional cooperation.

Agreed conclusions and recommendations

6. The Consultation agreed on the conclusions and recommendations set out below.

Conclusions

7. The participants agree that there is an imbalance in the availability of raw materials for the animal-feed industry in Africa, which constitutes a major constraint on its development in most countries of the region. As the main raw materials used for animal-feed production are cereals and as cultivable land is scarce, there is inevitably competition with the production of food for human consumption. It is agreed that the problems related to the production of animal feed differ for ruminants and for monogastrics. It is also noted that ruminants consume all types of raw material that do not compete with human consumption whereas monogastrics require a diet that could compete with human consumption.

8. It is recognized that a better utilization of agricultural and agro-industrial by-products and non-conventional feed resources, as well as innovative cultivation, would increase the availability of raw materials for the animal-feed industry. In many cases, the conversion of locally available by-products, residues and wastes would help to solve significant environmental problems.

Agro-industrial by-products

9. Agro-industrial by-products and residues suitable for the production of animal feed such as molasses, fish waste, spent grains from breweries, brans and by-products from slaughterhouses have largely remained unused. It is accepted that, in general, there are good possibilities for attaching animal-feed-producing units to agro-industrial production plants such as flour mills, oil mills and breweries, and that the technical and economic viability of such units should be explored. In some countries the available agro-industrial by-products such as bran, fish-meal or molasses are being exported and are, therefore, not available as raw materials for animal-feed production.

Feed formulation

10. There is a lack of information regarding local raw materials including agro-industrial by-products, especially concerning their availability, composition and overall feed value, which constitutes an impediment to the appropriate formulation of feed. In cases where such information exists, the means of disseminating it are practically non-existent. This is recognized to be one of the major constraints.

11. It is also recognized that the lack of information regarding processing know-how and suitable equipment is yet another impediment. The interface between research and development institutions and industry as well as between feed producers and users is inadequate.

Quality control

12. The importance of quality-control of raw materials as well as final products is stressed. The establishment or strengthening of special quality-control units within the framework of existing research institutes is essential, especially to serve the needs of small-scale producers.

13. The linkage between the quality of animal feed and the performance of animals is recognized. Consequently, it is agreed that awareness of this linkage would help to develop the local market for animal feeds. It is noted that efforts by Governments and animal-feed producers would create a greater interest on the part of the consumers in animal feed of good quality.

Prices and marketing

14. Existing price structures need to be rationalized because the market distortions created by them hamper the development of, and trade in, the animal-feed industry.

Size of enterprises

15. Regarding the scale of enterprises, it is considered by some participants that the best solution would be to establish large enterprises serving regional markets whereas other participants consider that there is a need for small-scale units on account of the high transport costs and lack of adequate infrastructure.

Equipment

16. The type of machinery available in developed countries is not the most appropriate for African countries; more suitable equipment could be found in other developing countries. It is agreed that special emphasis should be given to the development and manufacture of equipment for the production of animal feed at the village level.

Training

17. There is an urgent need for training, especially the training of technicians in the fields of feed formulation and industrial management and at the operational level.

UNIDO assistance

18. The importance to developing countries of UNIDO activities in investment promotion and project development and implementation in the animal-feed industry is recognized.

Government policy

19. There is a need for a carefully formulated government policy for the development of the animal-feed industry covering credit, foreign trade, agricultural prices, taxes, subsidies etc.

Regional cooperation

20. There is a need to develop a regional network for the dissemination of information and know-how on the animal-feed industry in Africa. This network could be developed in close cooperation with existing institutions in the region.

Recommendations

21. The production of animal feed should be enhanced by utilizing, to the maximum extent possible, local raw materials, and agro-industrial by-products and residues. Priority should be given to this effort on account of its direct impact on food self-sufficiency.

22. Research institutes in developed and developing countries should strengthen their activities concerning the location, availability, composition and feed value of local raw materials and agro-industrial by-products and residues in African countries. A database should be built on the nutritive value of these ingredients for use by the animal-feed industry. Such a database could take into account the publication of the Food and Agriculture Organization of the United Nations (FAO) on tropical feeds. UNIDO should initiate appropriate efforts to strengthen cooperation further between research institutes and industry.

23. A regional network should be established to enhance the flow of information among African countries regarding local raw materials, agro-industrial by-products and residues especially regarding their location, availability, composition, feed value and processing. UNIDO, in collaboration with the African Regional Centre for Technology (ARCT), FAO, the International Livestock Centre for Africa (ILCA) and other concerned regional organizations should assist in the establishment of such a network.

24. UNIDO, in collaboration with other appropriate institutions, should identify cost-effective technologies for processing agro-industrial by-products into suitable ingredients for animal-feed production. The information thus obtained should be widely disseminated, possibly through the regional network.

25. UNIDO, taking account of its own knowledge and experience of other developing countries, especially within the framework of economic and technical cooperation among developing countries (ECDC/TCDC), should assist African countries in the choice of appropriate technologies and equipment. It should also advise these countries on the manufacture of suitable tools at the local level.

26. UNIDO should also prepare an information booklet on the kinds of equipment and machinery required for the production of different animal-feed formulas in order to enable developing countries to select the most suitable equipment and machinery for their specific needs.

27. UNIDO, at the request of the African countries concerned, should help to identify suitable projects in the animal-feed industry and possible sources of financing for those projects. It should also assist these countries in their negotiations with potential partners.

28. Priority should be given by the research institutes concerned in Africa to the establishment or strengthening of special quality-control services to serve the needs of small-scale producers.

29. Existing training centres should expand their facilities in order to accommodate practical training courses in the animal-feed production sector.

30. Governments should formulate appropriate economic, fiscal, commercial and agricultural policies to promote the efficient production and utilization of animal feed.

I. Organization of the Consultation

Opening of the Consultation

Statement on behalf of the Director-General of UNIDO

31. In his opening statement, on behalf of the Director-General of UNIDO, the Deputy Director-General of the Department for Industrial Promotion, Consultations and Technology expressed the appreciation of the Director-General and his colleagues for the interest shown by the participants in a subject that was of key importance to the economic development of the developing countries, especially the least developed ones. He said that, given the fact that food self-sufficiency and security was of primary concern to African countries, the System of Consultations attached great importance to the food-processing sector through an integrated approach with due attention being paid to the related upstream and downstream industries.

32. The Deputy Director-General emphasized the economic and industrial importance of the animal-feed industry for a large number of developing countries. The increasing use of by-products of the agro-based industry as animal feed had led to greater integration of the two subsectors. He further stated that because cereal grains were the main component of the animal-feed industry and also major staple foods, the production of animal feeds competed directly with the production of food for human consumption. Therefore, urgent attention needed to be devoted to increasing the availability of an assured supply of raw materials. The increased use of industrial by-products required suitable processes and adequate equipment, especially in the case of small-scale industries.

33. Another difficulty impeding the development of the animal-feed industry was the poor dissemination of information on the availability, composition and processing requirements for non-conventional, locally available feed ingredients. The absence of institutional support, which was generally accompanied by inefficient infrastructure and utilities, was a further constraint on the development of the sector, often aggravated by the weakness and instability of national policies and the non-availability of skilled personnel. The Deputy Director-General concluded by pointing out that the Consultation had the task of finding creative solutions to the problems of the sector and to formulating practical recommendations.

Statement by the Director of the System of Consultations Division

34. The Director of the System of Consultations Division pointed out that the purpose of Consultations was to reveal industrial needs in a given subsector and to identify the opportunities through which those needs could be satisfied. He defined the System of Consultations as a catalyst that enabled the participants to discover mutually beneficial relationships. For that purpose UNIDO experts, who were familiar with the operational, financial, investment and technology aspects of the subsector, would be available throughout the Consultation meeting to facilitate the discussions.

35. He stated that, in the estimation of UNIDO, the animal-feed industry had an enormous potential for growth in the developing countries because locally available ingredients were underutilized as raw material. The situation could be improved dramatically by increasing the amount of information about those ingredients and their nutritional value, the best possible formulations that could be made from

them and their availability. That task inevitably would have to be done through research and through the use of appropriate technology, which, in turn, emphasized the role of mutual relationships between the developed and the developing countries, because most of the technology, research and equipment for which the developing countries had an enormous need were available from the developed countries. He also stressed the importance of training.

36. The Director of the System of Consultations Division drew attention to the urgent necessity of dealing with the environmental problems of the subsector. He pointed out that the problems could be transformed into opportunities. For example, discarded fish waste was an environmental hazard; but if it was converted into animal feed, that same waste could be turned into a useful as well as a valuable product.

37. He noted the strong presence of representatives of the least developed countries, which was a natural and welcome fact as the subsector was oriented towards solving grass-roots issues. Furthermore, it reflected the importance that the least developed countries attached to the subsector. There was, therefore, a need to look at their interests in particular and the question of the possibilities for regional and subregional cooperation.

38. The Director concluded by saying that UNIDO approached the meeting with a certain sense of privilege and optimism. Privilege in the sense that the meeting was dealing with a very basic human need, and optimism because the subject was an area in which the technology was not so complex, and therefore more easily to master and acquire, and financial outlays were not so enormous as to be unattainable.

Election of officers

39. The following officers were elected:

Chairperson:	Joseph P. Magadi (Kenya), Animal Nutritionist, UNGA Feeds Limited
Vice-Chairpersons:	Stella Aviram Neuman (Costa Rica), Ministro Consejero, Misión Permanente de Costa Rica ante la ONUDI, Viena
	Leonardo Ingargiola (Italy), Sales Director, OCRIM S.p.A.
	Abdul-Bassit Abdu Asaad (Yemen), Head of Feed and Water Analysis Laboratory, Directorate General of Animal Resources, Ministry of Agriculture and Water Resources
Rapporteurs:	Helix Glory Chizaso Nyirenda (Malawi), Stockfeeds Manager, Grain and Milling Co. Ltd
	Komlavi A. Doh (Togo), Directeur général adjoint, SATAL

Adoption of the agenda

40. The Consultation adopted the following agenda:

1. Opening of the Consultation.
2. Election of Chairperson, Vice-Chairpersons and Rapporteur.
3. Adoption of the agenda and organization of the work.
4. Presentation of the issues by UNIDO.
5. Discussion of the issues:
   (a) Promotion of the use of local agricultural and industrial raw materials, by-products and wastes, including research and information on the composition, modalities of utilization and processing requirements as well as quality control and the development of regional cooperation;
   (b) Promotion of small- and medium-scale enterprises with special emphasis on appropriate technologies, training and regional cooperation.
6. Other business.
7. Conclusions and recommendations.
8. Adoption of the report.
9. Closure of the Consultation meeting.
10. Identification or negotiation of industrial investment and technical cooperation projects.

Documentation

41. The documents issued prior to the Consultation are listed in annex II.

Adoption of the conclusions and recommendations

42. The report of the Regional Consultation on Animal Feed and Related Industries in Africa was adopted by consensus at the final plenary on 7 October 1993. On the same day, the participants were given the opportunity of having meetings with UNIDO staff members and discussing possibilities for future cooperation.

43. The participants were also taken on a technical visit to the company Bamberger GmbH in Prinzersdorf, Austria.

II. Report of the Consultation

Presentation of the issues

Issue 1: Promotion of the use of agricultural and industrial raw materials, by-products and wastes, including research and information on the composition, modalities of utilization and processing requirements as well as quality control and the development of regional cooperation.

44. A representative of the UNIDO Secretariat presented the first issue paper to the Consultation. He stated that the main objective of the paper was to highlight the need for developing countries, and in particular those in Africa, to increase the use of by-products from industry and non-traditional raw materials for the production of animal feed. Owing to population growth, agricultural land had become scarce and there was constant competition for raw materials to be used either as food or as feed. To overcome this difficulty, non-traditional ways of feeding farm animals had to be found, among others, through the utilization of agro-industrial by-products and residues.

45. He indicated the main groups of agricultural by-products that could be used as raw materials for animal feed and the problems connected with their use: by-products from the vegetable oil industry; bran and other residues from the flour milling industry; and by-products from the rice milling industry and the beer brewing industry as well as from the fish, sugar and other industries. He stated that either better quality by-products had to be produced by the factory, which would necessitate making technical modifications in the production process, or the by-products had to undergo additional preparatory processing operations.

46. He further identified the main problem areas in the processing of raw materials. One of them was the composition of feed in that the animal-feed industry in developing countries lacked access to research regarding feed formulation. Also most small-scale producers of compound feed and its users in the region might be finding it extremely difficult to obtain information for making decisions. Information was lacking not only on the raw materials for feed formulation and production, and on research results, but also on quality control, technology, finance and all aspects of the production and utilization of compound animal feed.

47. He said that extensive scientific and applied research had been carried out in industrialized countries in the animal-feed production sector, which had laid the basis for the formulation, production and optimum utilization of animal-feed compounds. The information resulting therefrom was available worldwide. Nevertheless, there was a need for research in developing countries, particularly with regard to unutilized or underutilized animal-feed ingredients, which were abundantly available but whose feed value had not yet been recognized.

Issue 2: Promotion of small- and medium-scale enterprises with special emphasis on appropriate technologies, training and regional cooperation.

48. The second issue also was introduced by a representative of the UNIDO Secretariat. He stated that economies of scale were important in the animal-feed industry, even in small-scale enterprises. Production capacity depended on the size of the market, which was the actual motor of the production

system. In developed countries the market was large and large-scale enterprises were predominant, producing a variety of feed products, whereas in developing countries the small- and medium-scale industry was designed to meet local demand which, it was stated, was generated by only a limited number of farms. He described what appeared to be a vicious circle; namely, that farms needed for their expansion an adequate supply of animal feed, whereas the producer of animal feed needed the assurance of a market in order to start producing. The question was as who should start action and how it should be started.

49. Regarding the production process, he stated that although the technology in animal-feed production was relatively simple and did not require technically sophisticated equipment and machinery it had to be adapted to meet specific conditions that might differ from one country to the other, such as climate, wages, energy and water supplies, raw-material preparation requirements, bagging and storage etc. The adaptation and development of equipment became even more important in the case of the processing of non-traditional ingredients. He also stressed the importance of the local manufacture of equipment, given the fact that it was not so sophisticated and that in many cases it was only a question of obtaining the necessary licences or drawings. He indicated that most of the equipment was not specific to the subsector but might be used by other agro-processing operations.

50. It was pointed out that quality control caused serious problems to small-scale feed producers because of their inability to afford laboratory facilities and trained staff; however, quality control was essential for the producer. The problem of quality control was also acute during the storage of both raw materials and final products. The best way to overcome the problem was by obtaining services from public and private institutions, universities or research laboratories. He stated that in most African countries such institutes existed and arrangements might be made for them to service customers from industry.

Summary of discussion

51. Several participants stated that the most significant impediment to the increased use of agro-industrial by-products and non-conventional feed resources was the lack of dissemination of information on locally available raw materials. One participant said that a great deal of technical information existed but it had to reach the producer of animal-feed compounds. It was stressed by several participants that the lack of awareness by the farmer could be overcome by the provision of extension services and information by feed-producing companies. However, in spite of the existence in the region of institutes dealing with technology development and of individual countries' successful experience in providing locally available raw materials to the breeders, extension services were inadequate and technical information was not disseminated to the farmers.

52. The need for increased research efforts in developed and developing countries on local raw materials, agro-industrial by-products and residues was highlighted by several participants. One participant mentioned the usefulness of the publication of FAO on tropical feeds; however, it was considered that the information needed to be completed and enlarged. Information on the nutritive value of alternative ingredients was considered to be of special importance to feed producers and farmers. It was mentioned that some by-products might not have sufficient nutritional value for certain animals and might have to be supplemented. Another participant mentioned the need for research and advice on the replacement of imported concentrates by locally available materials. In many countries, the lack of use of industrial by-products was related to the lack of knowledge of the technology for converting by-products into feed. Wet industrial by-products, for example, brewery waste and tomato sauce, could be utilized as feed; however, technical information on the drying process of wet by-products was not available.

53. Several participants stressed the fact that industrial by-products in general needed some kind of treatment, for which equipment was required that, although simple, might not be available in the country. Another participant pointed out that most parts of the equipment for small-scale production could be produced locally. This statement was supplemented by another participant, who pointed out that equipment might not be the traditional grinding, blending or pelleting type but some other type such as rolling-mills to extract sugar-cane juice or chipping equipment for cassava. Most participants agreed that increased efforts concerning research as well as technologies and equipment were needed.

54. The need for feed conservation in periods of abundance, which would be used during periods of drought, was raised by several participants. It was pointed out that that was a serious problem affecting mainly ruminant breeders in regions with a very dry season and also areas that were far away from urban centres where most animal-feed factories were located.

55. There was agreement among the participants about the need to establish a regional network to increase the flow of information on raw materials, by-products and residues, especially with regard to their availability, composition, feed value and processing technologies and equipment. The need to associate subregional organizations in the establishment of a regional network was stressed by some participants. It was noted that a network would be inefficient if, at a local level, the extension services did not guarantee that the results of research reached the farmers. One participant suggested that because of the climatic and geographical similarities the network should work through eco-zonal subregions (e.g. the Sahel, east and central Africa) instead of political zones.

56. The problem of costs was raised by addressed by several participants. One participant said that the increase in the cost of key input might affect the profitability of treating low-cost raw materials. The problem of adequately assessing the cost benefit of using different mixtures of feed had to be addressed. The need for cost-effectiveness and the use of industrial by-products was related to cattle-raising methods. Several participants highlighted the fact that traditional, migratory (transhumance), extensive cattle-raising methods were not likely to promote an increase in the consumption of industrial by-products. Others said that there was a larger market for commercially raised monogastrics.

57. The issue of the type of plant and the optimum scale of production was raised by several participants. One participant stated that, in Africa, large-scale enterprises did not exist in the animal-feed sector. He also said that small- and medium-scale enterprises were more suitable because they were easy to manage and operate, used simple technology and were flexible enough to be adapted to different sources of raw materials. In the countries of the Sahel, however, the establishment of small-scale enterprises in rural areas seemed to be difficult and the best solution was probably the simple conservation of raw materials. Several participants stressed the fact that transport costs in Africa were extremely high for the low-cost raw materials used in the animal-feed industry, and that therefore only small-scale units using local raw materials were economically viable. It was also indicated that a special effort was needed to disseminate simple processing techniques and equipment. Large units, geared eventually to the regional market, were found by several participants to be uneconomical because of the high costs of transport as well as the insecurity of the neighbouring markets. The possibility of using mobile plants was mentioned by some participants, but several other participants maintained that they did not constitute a solution to the problems of traditional extensive cattle-raising.

58. Quality control was felt by most participants to be a major issue. Small-scale enterprises were not in a position to set up their own quality-control units. Some participants suggested that research institutes should provide special quality-control services to serve the needs of small-scale producers. Several participants stated that the problem of quality was linked to marketing and the possibility of introducing new varieties of animal feed to consumers. Many participants mentioned the need for training, which was needed at different levels. Management was an area in which UNIDO should

develop training courses. The need to train nutritionists was also mentioned, in order to ensure that the mixes produced by factories met the highest quality standards.

59. One participant from an Asian country noted that, in his country, raw materials for animal-feed production were abundant in the form of groundnuts, coconuts, rice husks and molasses. Technical assistance and foreign investment were necessary to convert those raw materials into animal feed.

60. Several participants stressed the need for government action in the area of quality and disease control. The need for livestock policies to improve the performance of animals was indicated by some participants. It was stated that without adequate government policies to remedy the lack of infrastructure and extension services it was not reasonable to expect any improvement in animal performance or an increase in the production and consumption of animal feed.

Notes

[1]"Report of the Industrial Development Board on the work of its sixth session, 28 May-1 June 1990" (GC.4/2), annex I, IDB.6/Dec.5.

[2]*Report of the Regional Preparatory Meeting on Animal Feed and Related Industries in Africa* (ID/WG.529/4(SPEC.)).

Annex I

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Annex II

LIST OF DOCUMENTS

Issue papers

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Issue 2: Promotion of small- and medium-scale enterprises, with special emphasis on adequate technologies, training and regional cooperation	ID/WG.532/6

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Present situation and development aspects of the animal feed industry in Ghana	ID/WG.532/4
Industries des aliments de bétail au Cameroun (available in French only)	ID/WG.532/7

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